

**WHAT IS CLAIMED IS:**

1. A tunable oscillator having a tuning voltage input, comprising:  
an inductor; and  
first and second varactor pairs arranged with the inductor to generate a signal having a frequency responsive to a tuning voltage applied to the tuning voltage input, each of the varactor pairs having a bias voltage input that may be controlled independently of the other varactor pair.
2. The tunable oscillator of claim 1 wherein the each of the varactor pairs comprises two serially coupled varactors each having a first node coupled to the tuning voltage input and a second node coupled to its respective bias voltage input.
3. The tunable oscillator of claim 2 wherein each of the varactors comprises a MOSFET having a gate, a drain, and a source connected to the drain, and wherein the first node of the varactor comprises the gate and the second node of the varactor comprises the drain and source connection.
4. The tunable oscillator of claim 2 further comprising a first resistor coupled between the tuning voltage input and the first node of a first one of the varactors in each of the varactor pairs, and a second resistor coupled between the tuning voltage input and the first node of a second one of the varactors in each of the varactor pairs.
5. The tunable oscillator of claim 2 further comprising a first capacitor coupled between a first node of the inductor and the first node of a first one of the varactors in each of the varactor pairs, and a second capacitor coupled between a second node of the inductor and the first node of a second one of the varactors in each of the varactor pairs.
6. The tunable oscillator of claim 1 further comprising an input current source to the inductor and the first and second varactor pairs.

7. The tunable oscillator of claim 6 wherein the input current source comprises a constant current source coupled to a pair of cross-coupled transistors.

8. The tunable oscillator of claim 1 further comprising a differential-to-single ended amplifier having a differential input coupled across the inductor.

9. A tunable oscillator having a tuning range, comprising:  
an inductor; and

first and second varactor pairs arranged with the inductor to generate a signal having a frequency responsive to a tuning voltage, wherein the first varactor pair is biased such that its capacitance varies substantially linearly with the tuning voltage over a first portion of the tuning range, and the second varactor pair is biased such that its capacitance varies substantially linearly with the tuning voltage over a second portion of the tuning range.

10. The tunable oscillator of claim 9 wherein the each of the varactor pairs comprises two serially coupled varactors each having a first node configured to receive the tuning voltage and a second node, each of the varactor pairs being biased at the second node of its respective varactors.

11. The tunable oscillator of claim 10 wherein each of the varactors comprises a MOSFET having a gate, a drain, and a source connected to the drain, and wherein the first node of the varactor comprises the gate and the second node of the varactor comprises the drain and source connection.

12. The tunable oscillator of claim 10 further comprising first and second resistors, the first node of a first one of the varactors in each of the varactor pairs being configured to receive the tuning voltage through the first resistor, and the first node of a second one of the varactors in each of the varactor pairs being configured to receive the tuning voltage through the second resistor.

13. The tunable oscillator of claim 10 further comprising a first capacitor coupled between a first node of the inductor and the first node of a first one of the varactors in each of the varactor pairs, and a second capacitor coupled between a second node of the inductor and the first node of a second one of the varactors in each of the varactor pairs.

14. The tunable oscillator of claim 9 wherein the first varactor pair is biased at approximately 1 volt when power is applied, and the second varactor pair is biased at approximately 2 volts when power is applied.

15. The tunable oscillator of claim 9 wherein the first portion of the tuning range is about 0.4 volts to about 1.4 volts when power is applied, and the second portion of the tuning range is about 1.1 volts to about 2.4 volts when power is applied.

16. A phase locked loop, comprising:  
a tunable oscillator having an inductor, and first and second varactor pairs arranged with the inductor to generate a signal having a frequency responsive to a tuning voltage, each of the varactor pairs having a bias voltage input that may be controlled independently of the other varactor pair;  
a divider configured to scale the signal frequency from the tunable oscillator;  
a phase detector configured to generate an error signal representative of a phase difference between the scaled signal frequency and a reference frequency; and  
a loop filter configured to filter the error signal, the filtered error signal comprising the tuning voltage.